

Roll No:

KARPAGAM COLLEGE OF ENGINEERING, COIMBATORE -641032.

BE-ELECTRICAL AND ELECTRONICS ENGINEERING

Semester: VI

12E605

POWER ELECTRONICS

Continuous Internal Assessment: I

Date:30/12/2015

Time: 1½ Hours

Session:FN

Maximum: 50 Marks

Answer ALL Questions

PART-A

(10 x 2 = 20)

- A1. Define latching and holding current of SCR.
- A2. Classify power semiconducting devices based on it's control strategy? Give examples for each.
- A3. List any four advantages of IGBT over MOSFET.
- A4. What is the difference between conduction loss and switching loss?
- A5. Draw the symbol of IGCT and write any two applications.
- A6. State the SOA of BJT and give its significance.
- A7. Sketch the two transistor model of IGBT and its symbol.
- A8. Mention any two advantages and disadvantages of TRIAC.
- A9. Define commutation and its types.
- A10. Give any four applications of GTO.

Answer ALL Questions

PART-B

(2x15 = 30)

- B1. (a) (i) The latching current of thyristor circuit with RL load is 50mA. The duration of the firing pulse is  $50\mu s$ . The value of  $R=20\Omega$  and  $L=0.5H$ . Supply voltage is 100 V. Will the device get fired? If the device does not get fired, then what should be the preferable duration of firing pulse to get latched? (8)
- (ii) Give the comparison of GTO with SCR. (4)
- (iii) Sketch switching characteristics of a thyristor during its turn-on and turn-off processes. (3)
- (OR)
- (b) (i) Explain the V-I characteristics of SCR with relevant waveform. (5)
- (ii) Explain the switching characteristics of MOSFET with necessary waveforms. (6)
- (iii) Compare MOSFET with BJT. (4)

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Answer ALL Questions

PART-B

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- (OR)
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- (ii) Explain the switching characteristics of MOSFET with necessary waveforms. (6)
- (iii) Compare MOSFET with BJT. (4)

- B2. (a) (i) Explain different modes of operation and V-I characteristics of TRIAC. (7)  
(ii) Derive the condition for the occurrence of latch up in SCR using two transistor analogy. (4)  
(iii) State the difference between TRIAC and SCR. (4)

(OR)

- (b) (i) Explain the switching performance of IGBT with relevant waveforms indicating clearly the turn-on and turn-off times and their components. (5)  
(ii) Describe resistance firing circuit used for triggering SCRs. Is it possible to get firing angle greater than  $90^{\circ}$  with resistance firing? Illustrate your answer with appropriate waveforms. (6)  
(iii) Draw and describe the output characteristics of BJT. (4)
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**Faculty in charge**

**HOD-EEE**

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(OR)

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